Nationaal Lucht- en Ruimtevaartlaboratorium
National Aerospace Laboratory NLR

AMS Tracker Thermal Control Subsystem

TTCB_He_leak_test_procedure

AMSTR-NLR-PR-025
ISSUE 1.1
FEBRUARY 2009

Sun Yat-Sen University (SYSU)
National Aerospace Laboratory (NLR)
Instituto Nazionale di Fisica Nucelare (INFN)

	NAME	ORGANISATION/RESPONSIBILITY	SIGNATURE	DATE
PREPARED	A. Pauw	NLR		
CHECKED	J. van Es	NLR / AMS SE		
AGREED	A. Pauw	NLR / AMS PA		
APPROVED	J. van Es	NLR / AMS PM		
AUTHORISED	P. Dieleman	NLR Space Department		

FILENAME	AMSTR-NLR-PR-025_TTCB_He_leak_test_procedure.doc	ORDER-/CODENUMBER:	2494047
LAST SAVED	2009.02.10 00:00 by jvanes	DIVISION:	AS&A
PRINTED	2009.09.07 16:02	DISTRIBUTION:	Unlimited
PAGES	14	CLASSIFICATION TITLE:	Unclassified

Distribution list

Company	*FOR**	*Name*	*Comments*
INFN	I	R. Battiston	
		M. Menichelli	
		C. Gargiulo	
		B. Alpat	
		A. Alvino	
		E. Laudi	
AMS	I	M. Capell	
		V. Koutsenko	
		R. Becker	
NLR	I	P. Dieleman	
		J.van Es	
		M. Bardet	
Jacobs Sverdrup	I	T. Martin	
		G. Clark	
AIDC	I	B. Hong	
		B. Hsu	
		W. Min Hsu	
CGS	I	M. Molina C. Vettore	

A = Approval
R = Review
I = Input / Information

An electronic version of this document is available on the AMS TTCS website:
https://ams-ttcs.nlr.nl

Document change log

Change Ref.	*Section(s)*	*Issue 1.0*
-	All	Initial issue based partly on PR-0053
1.1	4.1	total allowed leak rate

Summary

This document describes the He leak test of the TTCB, the complete assembled component box of the TTCS.

Contents

(14 pages in total)

1 Scope of the document

The procedure in this document describes the He-leak test of the TTCS component box, TTCB. The TTCB leak test will be executed after integration of the TTCB to verify the leak tightness of the welds. The leak test shall also be executed after each major transport, proof pressure test and each environmental test to verify the integrity of the components and welds.

2 References documents

	Title	Number	Date
RD-1	TTCS Leak rate	AMSTR-NLR-TN-046-Issue 1.0	April 2006

3 Description of the item under test

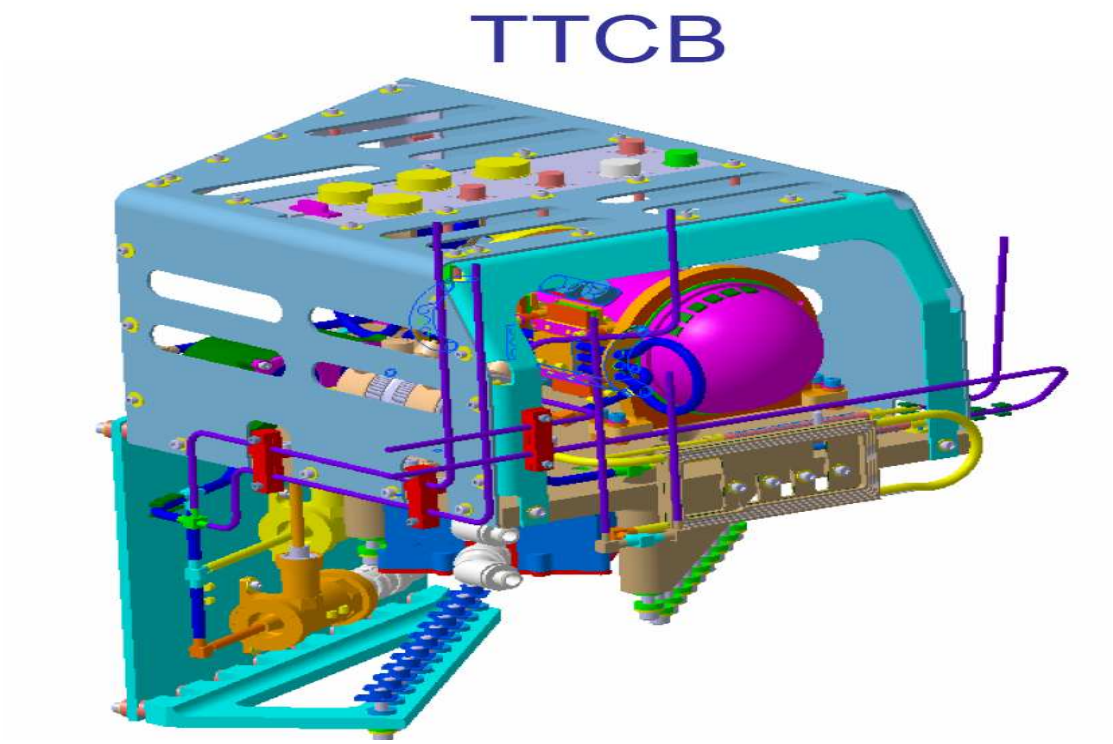

Figure 3-1: TTCB without additional tubing for He leak test

For the He leak test additional tubing must be used for connecting the TTCB inlet and outlet tubes in such way the pump is connected to the He leak tester from both sides. This to prevent difficulties with creating vacuum for leak test or purging the TTCB after leak test.

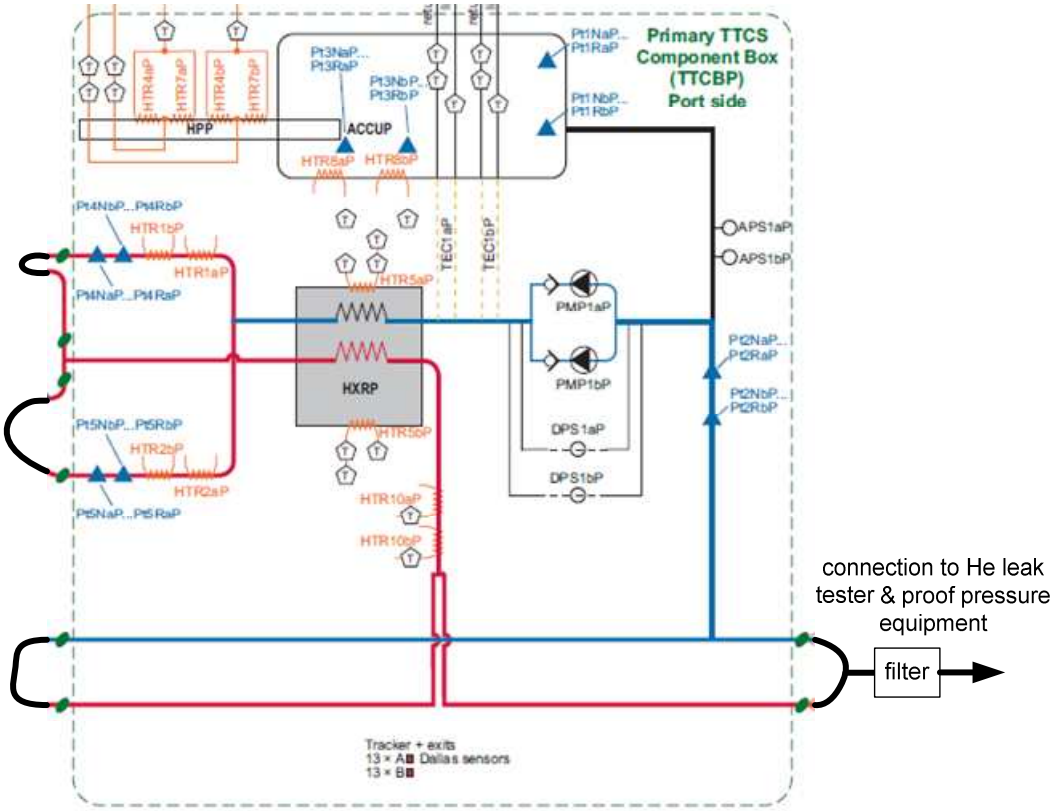

Figure 3-2: TTCB schematic with additional tubing for He leak test & proof pressure test

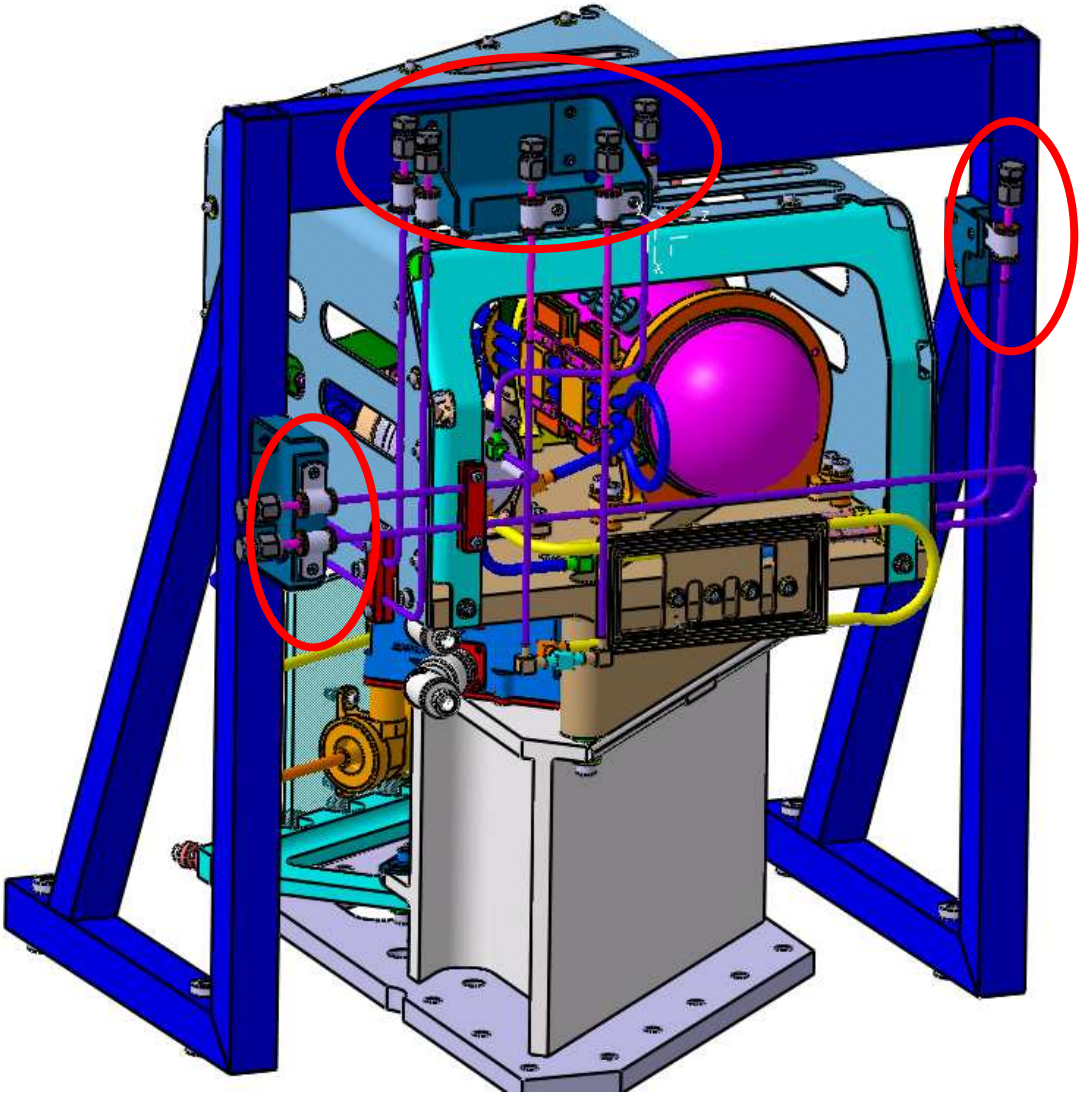

Figure 3-3: Red indication connections should be located outside the He-filled enclosure

4 He Leak Test description

The He-leak test shall be the vacuum method, the TTCB will be connected to the leak tester and He will be sprayed around the TTCB. The complete TTCB shall be placed in an enclosure, 'closed box', while the additional tubes and fittings are outside the enclosure.

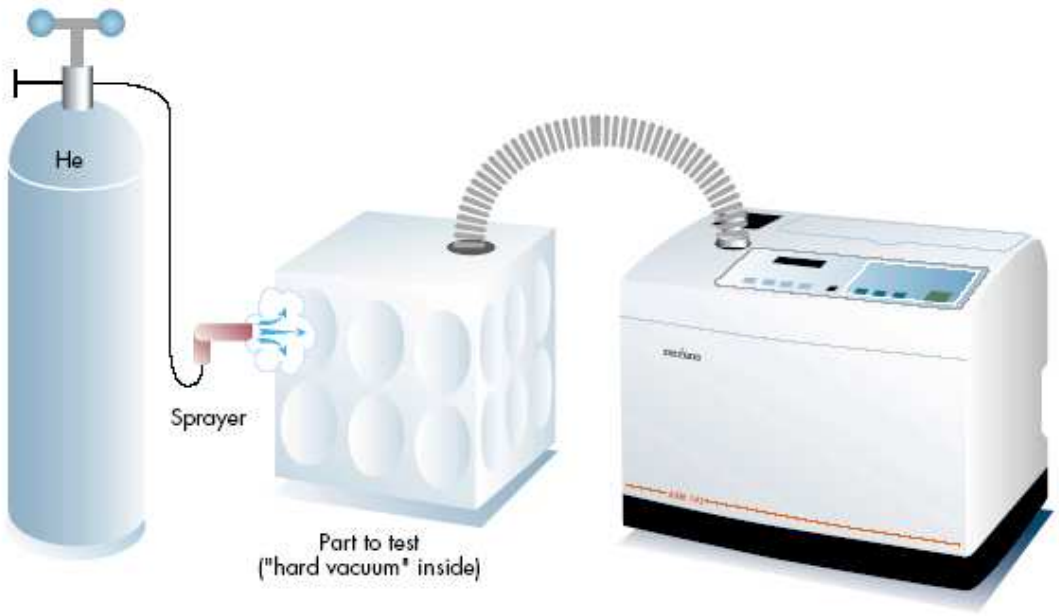

Figure 4-1: He leak test, vacuum method

The main steps of the leak test:

1. back ground leak test: test item not connected to leak tester and do leak test with blind flange, verify leak tester output without He, LR < $2*10^{-10}$ mbar.l/s.
2. TTCB leak test: place TCCB in enclosure and connect TTCB to leak tester .
3. perform leak test without He
4. perform leak test with He sprayed into enclosure
5. back ground leak test: test item not connected to leak tester and do leak test with blind flange, verify leak tester output without He, LR < $2*10^{-10}$ mbar.l/s.

4.1 TTCB Helium leak test procedure

	He leak test procedure sheet TTCB		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
1.	Record Test Item description.	T.I. description	-			
2.	Record model (QM / FM-P / FM-S)	model	-			
3.	Record test equipment used	manufacturer, type	-			
4.	Connect the additional support tubes to TTCB as depicted in figure 3-1					
5.	Place TTCB in enclosure, make sure fittings additional support tubes are **OUTSIDE** enclosure See Figure 3-3.					
6.	He leak test: Measure equipment background level (put cap on tester, without test item being connected)	background He-leak rate	$< 2*10^{-10}$ mbarl/s			
7.	Clean test equipment which will be in contact with the test item with clean IPA and a cloth					
8.	Perform a visual inspection no particles are found on this test equipment. If particles are found repeat step 5.					

	He leak test procedure sheet TTCB		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
9.	Connect the Test Item to He leak tester as depicted in figure 3-1		-			
10.	He leak test: Measure leak rate value without spraying helium.	background leak rate	$< 5*10^{-10}$ mbarl/s			
11.	He leak test: Spray He into enclosure and measure leak rate value when the enclosure is filled with helium.	He leak rate	$< 4*10^{-8}$ mbarl/s			
12.	Dis-connect TTCB from leak tester					
13.	Close all the enterance using Swagelok cap or plug.					
14.	He leak test: Measure equipment background level (put cap on tester, without test item being connected)	background He-leak rate	$< 2*10^{-10}$ mbarl/s			
15. 16.	End					

END OF DOCUMENT